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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,845	09/26/2003	Niranjan Damera-Venkata	200312385-1	1627

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EXAMINER	
SHAPIRO, LEONID	

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 07/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/672,845	DAMERA-VENKATA ET AL.	
	Examiner	Art Unit	
	Leonid Shapiro	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,16-18,22 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2-13-04, 5-13-05, 12-27-04, 9.26-03
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2,4,16-18,22,24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbon et al. (Pub. No.: US 2003/0020809 A1) in view of Chao et al. (US Patent No. 6,711,299 B2).

As to claim 1, Gibbon et al. teaches a method of displaying an image with a display device (See paragraph 0001), the method comprising:

receiving a first set of image data for a first image (See paragraphs 0012,0031);

generating a first sub-frame (See Fig. 5, item 33 and Fig. 6, item 41, paragraphs 0034-0035) and a second sub-frame (See Fig. 5, item 34 and Fig. 6, item 51, paragraphs 0034-0035) corresponding to the first set of image data;

alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position (See Fig. 7, paragraph 0036).

Gibbon et al. does not disclose reducing a bit-depth of the first and the second sub-frames based on a first set of quantization equations, thereby generating a first dithered sub-frame and a second dithered sub-frame.

Chao et al. teaches reducing a bit-depth based on a first set of quantization equations, thereby generating dithered pixel values (See Fig. 10, items steps 140,142,144, from Col. 10, Line 50 to Col. 11, Line 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Chao et al. into Gibbon et al. system in order to provide high resolution images to audience (See paragraph 0006 in the Gibbon reference).

As to claim 16, Gibbon et al. teaches a system for displaying an image (See paragraph 0001), the system comprising:

a buffer (inherent for DMD projection system) adapted to receive a first set of image data for a first image (See paragraphs 0012,0031);

an image processing unit configured to define first sub-frame (See Fig. 5, item 33 and Fig. 6, item 41, paragraphs 0034-0035) and a second sub-frame (See Fig. 5, item 34 and Fig. 6, item 51, paragraphs 0034-0035) corresponding to the first set of image data;

a display device adapted alternately display the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position (See Fig. 7, paragraph 0036).

Gibbon et al. does not disclose reducing a bit-depth of the first and the second sub-frames based on a first set of quantization equations, thereby generating a first dithered sub-frame and a second dithered sub-frame.

Chao et al. teaches reducing a bit-depth based on a first set of quantization equations, thereby generating dithered pixel values (See Fig. 10, items steps 140,142,144, from Col. 10, Line 50 to Col. 11, Line 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Chao et al. into Gibbon et al. system in order to provide high resolution images to audience (See paragraph 0006 in the Gibbon reference).

As to claim 22, Gibbon et al. teaches a system for generating low resolution sub-frames for display at spatially offset positions to generate the appearance of a high resolution image (See paragraphs 0006,0012), the system comprising:

means for receiving image data for a plurality of high resolution images (See paragraphs 0006,0012);

means for generating a plurality of sets of low resolution sub-frames based on the image data, each set of low resolution sub-frames corresponding to one of the high resolution images (See Fig. 5, items 33-34 and Fig. 6, items 41,51, paragraphs 0034-0035).

Gibbon et al. does not disclose means for spatially and temporally dithering the plurality of sets of low resolution sub-frames to generate a corresponding plurality of sets of low resolution dithered sub-frames.

Chao et al. teaches reducing a bit-depth based on a first set of quantization equations, thereby generating dithered pixel values (See Fig. 10, items steps 140, 142, 144, from Col. 10, Line 50 to Col. 11, Line 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Chao et al. into Gibbon et al. system in order to provide high resolution images to audience (See paragraph 0006 in the Gibbon reference).

As to claim 24, Gibbon et al. teaches a computer-readable medium having computer-executable instructions for performing a method of generating low resolution sub-frames for display at spatially offset positions to generate the appearance of a high resolution image (See paragraphs 0006,0012), the system comprising:

receiving image data for a plurality of high resolution images (See paragraphs 0006,0012);

generating a plurality of sets of low resolution sub-frames based on the image data, each set of low resolution sub-frames corresponding to one of the high resolution images (See Fig. 5, items 33-34 and Fig. 6, items 41,51, paragraphs 0034-0035).

Gibbon et al. does not disclose quantizing each set of sub-frames corresponding to high resolution images in the first set based on a first plurality of dither values; quantizing each set of sub-frames corresponding to high resolution images in the second set based on a second plurality of dither values that is different than the first plurality of dither values; and wherein the quantizing steps provides a spatial and temporal dither of the sub-frames.

Chao et al. teaches reducing a bit-depth based on a first set of quantization equations, thereby generating dithered pixel values (See Fig. 10, items steps 140, 142, 144, from Col. 10, Line 50 to Col. 11, Line 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Chao et al. into Gibbon et al. system in order to provide high resolution images to audience (See paragraph 0006 in the Gibbon reference).

As to claims 2,4 Chao et al. teaches the first set of quantization equations includes two or more different quantization equations (see Fig. 12, item 173, Col. 11, Lines 12-26).

As to claims 17-18 Chao et al. teaches single and two dither values (See Fig. 10, items steps 140, 142, 144, Col. 10, Line 50-67).

Allowable Subject Matter

3. Claims 3,5,6-13,19-21,23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Relative to claim 3 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that the bit-depth of the first sub-frame is reduced based on a first of the two quantization equations, and the bit-depth of the second sub-frame is reduced based on a second of the two quantization equations.

Relative to claim 5 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that the bit-depth of the first sub-frame is reduced based on first and second ones of the four quantization equations, and the bit-depth of the second sub-frame is reduced based on third and fourth ones of the four quantization equations.

Relative to claim 6 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that generating a third sub-frame and a fourth sub-frame corresponding to the first set of image data; reducing a bit-depth of the third and the fourth sub-frames based on the first set of quantization equations, thereby generating a third dithered sub-frame and a fourth dithered sub-frame; and wherein alternating between displaying the first dithered sub-frame and displaying the second dithered sub-frame further includes alternating between displaying the first dithered sub-frame in the first position, displaying the second dithered sub-frame in the second position, displaying the third dithered sub-frame in a third position spatially offset from the first position and the second position, and displaying the fourth dithered sub-frame in a fourth position spatially offset from the first position, the second position, and the third position.

Relative to claim 7 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that reducing a bit-depth of the third and the fourth sub-frames based on a second set of quantization equations, thereby generating a third dithered sub- frame and a fourth dithered sub-frame; and alternating between displaying the third dithered sub-frame in the first

position and displaying the fourth dithered sub-frame in the second position.

Claims 8-12 depend on claim 7.

Relative to claim 13 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that identifying a dither value from the at least one array for each pixel in the first and the second sub-frames based on a spatial location of the pixel and a temporal location of the sub-frame containing the pixel; and reducing a bit-depth of each pixel in the first and the second sub-frames based on the identified dither value for the pixel.

Claims 14-15 depend on claim 13.

Relative to claim 19 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that each pixel value is quantized by dividing a sum of the pixel value and a dither value by a first value, taking a floor of the result of the division, and multiplying the result of the floor by the first value.

Relative to claim 20 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that the buffer is adapted to receive a second set of image data for a second image, and the image processing unit is configured to define a third sub-frame and a fourth sub-frame corresponding to the second set of image data, and generate corresponding third and fourth dithered sub-frames by quantizing pixel values of the third sub-frame using a third set of dither values, and quantizing pixel values of the fourth sub-frame using a fourth set of dither values.

Claim 21 depend on claim 20.

Relative to claim 23 the major difference between the teaching of the prior art of record (Gibbon et al. and Chao et al.) and the instant invention is that the plurality of high resolution images includes first and second sets of high resolution images, and wherein the means for spatially and temporally dithering comprises: means for quantizing each set of sub-frames corresponding to high resolution images in the first set based on a plurality of even dither values, and quantizing each set of sub-frames corresponding to high resolution images in the second set based on a plurality of odd dither values.

Telephone Inquire

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS
06.26.06

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